REMARKS

Claims 1-22 have been cancelled without prejudice. New Claims 23-78 have been added. The specification has been amended. It is submitted that the new claims and the amendments to the specification do not constitute new matter. Reconsideration and allowance is respectfully requested in view of the amendments and the following remarks.

The Use of Trademarks

The Examiner has noted that trademarks are used throughout the application. The Applicant has amended the specification as indicated above and in the marked-up version.

The § 103 Rejections

In the Final Office Action mailed on June 15, 2001, Claims 1-22 were rejected under 35 USC § 103(a) as being unpatentable over Dubin (US Patent 5,284,492).

Claims 1-22 have been cancelled and therefore, the rejection is moot. However, the Applicant respectfully disagrees with the Examiner's assertions.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art; that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996). To establish *prima facie* obviousness of a claimed invention, all claim

limitations must be taught by the prior art. *In re Royka*, 180 USPQ 580 (CCPA 1974). All words in a claim must be considered in judging the patentability of that claim against the prior art. *In re Wilson*, 165 USPQ 494 (CCPA 1970).

Dubin teaches an improved lubricity water and fuel oil emulsion. The emulsion is used as fuel for an electric power generating turbine, and includes a lubricity additive selected from the group consisting of dimer acids, trimer acids, phosphate esters, sulfurized castor oil, and mixtures thereof. (Abstract) As the Examiner points out, Dubin teaches the use of water, and although demineralized water is not required, the use of demineralized water is preferred. (Col. 4, lines 30-38) The claims recite the use of purified water. Demineralized water and 'water' are not the same as purified water. As stated in the specification on page 3, paragraph 3, lines 13-25,

> The amount of purified water preferably is between about 5 weight percent and about 50 weight percent of the fuel composition, more preferably between about 20 weight percent and about 30 weight percent of the fuel composition. The purified water preferably contains no greater than about 50 parts per million calcium and magnesium ions, and no greater than about 20 parts per million silicon. More preferably, the purified water has a total hardness of less than 10 parts per million and contains no greater than about 2 parts per million calcium and magnesium ions, and no greater than about 1 part per million silicon.

As stated in the specification and claims, the purified water contains low concentrations of calcium, magnesium, and silicon. Purified water is not demineralized water. Demineralized water does not have any mineral concentrations in the water, hence demineralized. As recited in the specification and claims, the purified water contains very low concentrations of minerals, i.e., calcium, magnesium and silicon. Therefore, a low concentration of minerals can be present in the purified water.

Additionally, the claims recite that the pH of the purified water is "adjusted to a pH of about 4 to about 7" and more preferably the pH is adjusted to "a pH of about 5 to about 6", in order to enhance emulsion formation, as well as having an anti-corrosion effect. The Dubin reference does not teach adjusting the pH.

Further, the Dubin reference does not teach the method as claimed in the independent claims. The Dubin reference teaches "[t]he emulsion used in the process of the present invention can be formed using a suitable mechanical emulsifying apparatus which would be familiar to the skilled artisan. Advantageously, the apparatus is an in-line emulsifying device for most efficiency. The emulsion is formed by feeding both the water and the fuel oil in the desired proportions to the emulsifying apparatus, and the emulsification system can either be admixed or dispersed into one or both of the components before emulsification or can be added to the emulsion after it is formed." (Col. 7, lines 4-14) The Dubin reference, does not teach the method as claimed.

Lastly, Dubin teaches that the emulsions are prepared such that the discontinuous phase preferably has a particle size wherein at least about 70% of the droplets are below about 5 microns Sauter mean diameter. More preferably, at least about 85%, and most preferably at least about 90%, of the droplets are below about 5 microns Sauter mean diameter for emulsion stability. (Col. 4, lines 38-44) In contrast, the present application teaches an emulsion having average droplet size of less than about 5 microns, with an average droplet size of about 1 micron or less preferred, and with an average droplet size of about 0.1 microns to about 1 micron most preferred.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 180 USPQ 580 (CCPA 1974). The Dublin reference does not teach "purified water" nor adjusting the pH of the purified water. Likewise, the Dubin reference does not teach the methods as recited in the claims. The Dubin reference does not teach all

the claim limitations. Therefore, the Examiner has failed to make a *prima facie* case of obviousness.

If an independent claim is non-obvious under 35 U.S.C. 103, then any claim depending therefrom is non-obvious. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). The new independent claims are non-obvious, and therefore, the new dependent claims are also non-obvious.

The § 112, first paragraph Rejections

Claims 10, 12, 15, and 16 have been rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention. The Examiner contends that there is no support in the specification as filed for the now claimed limitations of a non-ionic polymeric dispersant (Claims 12 and 16). The Examiner also contends that there is no support in the specification as filed for the now claimed "EO/PO block copolymer having approximately between 20 weight percent ethylene oxide (EO) and an approximate molecular weight of the propolene oxide (PO) block of about 1700 (Claims 10 and 15).

Claims 10, 12, 15, and 16 have been cancelled. The rejection is now moot.

However, the Applicant respectfully disagrees with the Examiner's assertions. Claims 12 and 16, as originally filed, contained the term ICI HYPERMER E 464. Applicant amended Claims 12 and 16, in the Response to Office Action filed on October 6, 1999, to overcome an indefiniteness rejection by amending ICI HYPERMER E 464 and replacing it with the equivalent a non-ionic polymeric dispersant.

Where the identification of a trademark is introduced by amendment, it must be restricted to the characteristics of the product known at the time the application was filed to avoid any question of new matter. MPEP §608.01(v).

The Declaration of Dennis L. Endicott, filed on November 15, 2001, states that "those of ordinary skill in the art of fuel emulsions would have known at the time of filing, July 1, 1998, that ICI HYPERMER E 464 is equivalent to 'a non-ionic polymeric dispersant.' " (Declaration of Dennis L. Endicott at paragraph 5.) Thus, the characteristics of ICI HYPERMER E 464, at the time of filing, were known to be equivalent to an "a non-ionic polymeric dispersant." Therefore, the §112 rejection of Claims 12 and 16 has been traversed.

Claims 10 and 15, as originally filed, contained the term PLURONIC 17R2. Applicant amended Claims 10 and 15, in the Response to Office Action filed on October 6, 1999, to overcome an indefiniteness rejection. The amended Claims 10 and 15 replaced the term PLURONIC 17R2 with the equivalent, an EO/PO block copolymer having approximately between 20 weight percent ethylene oxide (EO) and an approximate molecular weigh of the propylene oxide (PO) block of about 1700.

The Declaration of Dennis L. Endicott, filed on November 15, 2001, states that "those of ordinary skill in the art of fuel emulsions would have known at the time of filing, July 1, 1998, that PLURONIC 17R2 is equivalent to 'an EO/PO block copolymer having approximately between 20 weight percent ethylene oxide (EO) and an approximate molecular weigh of the propylene oxide (PO) block of about 1700.' " (Declaration of Dennis L. Endicott at paragraph 4.) Thus, the characteristics of PLURONIC 17R2 at the time of filing were known to be equivalent to an "EO/PO block copolymer having approximately between 20 weight percent ethylene oxide (EO) and an approximate molecular weigh of the propylene oxide (PO) block of about 1700". Therefore, the Examiner's §112 rejection of Claims 10 and 15 has been traversed.

The Double Patenting Rejection

Claims 1-22 have been provisionally rejected under the doctrine of obviousness-type double patenting as being unpatentable over Claims 1-19 of co-pending Application No. 09/109,028.

Claims 1-22 have been cancelled and therefore, the rejection is now moot.

In view of the foregoing, consideration and an early allowance of this application are earnestly solicited.

Respectfully submitted,
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VERSION WITH MARKED-UP CHANGES

In the Specification:

Please amend the following paragraphs as follows:

Page 7 to Page 8, Paragraph 23:

The surfactant package preferably includes one or more block copolymers. The block copolymers of the surfactant package act as a stabilizer of the primary surfactant. Suitable block copolymers may have surfactant qualities, however; it is believed, this belief having no limitation on the scope or operation of this invention, that the unexpected, superior results of the present invention are a result of a 'synergistic' effect of the block copolymer in combination with the primary surfactant. The block copolymer acts as a stabilizer of the primary surfactant at the interface. Examples of suitable block copolymers for the surfactant package include high molecular weight block copolymers, preferably ethylene oxide (EO)/propylene oxide (PO) block copolymers such as octylphenoxypolyethoxyethanol (a block copolymer produced by BASF as [Pluronic]PLURONIC 17R2). Examples of preferred block copolymers include [Pluronic]PLURONIC 17R2, [Pluronic]PLURONIC 17R4, [Pluronic]PLURONIC 25R2, [Pluronic]PLURONIC L43, [Pluronic]PLURONIC L31, and [Pluronic]PLURONIC L61, all commercially available from BASF. The block copolymer is present in the invert fuel emulsion composition in the range of about 1,000 ppm to about 5,000 ppm, more preferably about 2,000 ppm to about 3,000 ppm.

The surfactant package preferably includes one or more high molecular weight polymeric dispersants. The polymeric dispersant acts as a surfactant enhancer/stabilizer, stabilizing the primary surfactant and contributing to the synergistic combination of the primary surfactant and block copolymer. A preferred polymeric dispersant is [Hypermer]HYPERMER E-464 commercially

available from ICI. Other suitable polymeric dispersants include [Hypermer]HYPERMER A-60 from ICI, a decyne diol nonfoaming wetter such as [Surfinal]SURFINAL-104 produced by Air Products, an amineoxide such as [Barlox]BARLOX BX12 from Lonza, and [Emulsan]EMULSAN, a bio-polymer surfactant from Emulsan. The polymeric dispersant is present in the invert fuel emulsion composition in the range of about 100 ppm to about 1,000 ppm, more preferably about 700 ppm to about 800 ppm.

Page 9, Paragraph 27:

The fuel composition may also include one or more ignition delay modifiers, preferably a cetane improver, to improve fuel detonation characteristics, particularly where the fuel composition is used in compression ignited engines. Examples include nitrates, nitrites, and peroxides. A preferred ignition delay modifier is 2-ethylhexylnitrate (2-15 EHN), available from Ethyl Corporation under the trade designation ["HiTec 4103"]HITEC 4103. Ammonium nitrate can also be used as a known cetane improver. Preferred compositions include about 0.1% to 0.4% by weight ignition delay modifier.

Page 9 to Page 10, Paragraph 28:

The fuel composition may include one or more lubricants to improve the lubricity of the fuel composition and for continued smooth operation of the fuel delivery system. Many conventional common oil-soluble and water soluble lubricity additives may be used and can be effective in amounts below about 200 ppm. The amount of lubricant generally ranges from about 0.04% to 0.1% by weight, more preferably from 0.04% to 0.05% by weight. An example of a suitable lubricants include a combination of mono-, di-, and tri-acids of the phosphoric or carboxylic types, adducted to an organic backbone. The organic backbone preferably contains about 12 to 22 carbons. Examples include [Lubrizol]LUBRIZOL 522A and mixed esters of alkoxylated surfactants in the

phosphate form, and di- and tri- acids of the Diels-Alder adducts of unsaturated fatty acids. The carboxylic types are more preferred because of their ashless character. A specific example of a suitable lubricant is [Diacid]DIACID 1550[™] (Atrachem's [Latol]LATOL 1550 or Westvaco Chemicals [Diacid]DIACID 1550), which is preferred due to its high functionality at low concentrations. The [Diacid]DIACID 1550 also has nonionic surfactant properties. Neutralization of the phosphoric and carboxylic acids, preferably with an alkanolamine, reduces possible corrosion problems caused as a result of the addition of the acid. Suitable alkanolamine neutralizers include amino methyl propanol, triethanolamine, and diethanolamine, with amino methyl propanol (available from Angus Chemical under the trade designation ["AMP-95"]AMP-95) being in about 0.05 to 0.4% by weight neutralizer, more preferably about 0.06%.

With fuel being the continuous phase and the use of highly purified water, there is a low potential for corrosion and erosion, however; the fuel composition may also include one or more corrosion inhibitors, preferably one that does not contribute a significant level of inorganic ash to the composition. One example is amino methyl propanol (available from Angus Chemical under the trade designation ["AMP-95"]AMP-95. The addition of citric acid will also inhibit corrosion via a small change in the pH of the water; citric acid also enhances the formation of the emulsion. Aminoalkanoic acids are preferred. An example of another suitable corrosion inhibitor is available from the Keil Chemical Division of Ferro Corporation under the trade designation ["Synkad 828"]SYNKAD 828. Preferred compositions include about 0.01% to about 0.05% by weight corrosion inhibitor.

Biocides known to those skilled in the art may also be added, provided they are ashless. Antifoam agents known to those skilled in the art may be added as well, provided they are ashless. The amount of antifoam agent preferably is not more than 0.0005% by weight.

Page 11, Paragraph 31:

The invert fuel emulsion composition may also include one or more coupling agents (hydrotropes) to maintain phase stability at high temperatures and shear pressures. High temperature and shear pressure stability is required, for example, in compression ignited (diesel) engines because all the fuel delivered to the injectors may not be burned to obtain the required power load in a given cycle. Thus, some fuel may be recirculated back to the fuel tank. The relatively high temperature of the recirculated fuel, coupled with the shear pressures encountered during recirculation, tends to cause phase separation in the absence of the coupling agent. Examples of preferred coupling agents include di-and tri-acids of the Diels-Alder adducts of unsaturated fatty acids. A specific example of a suitable coupling agent is [Diacid]DIACID 1550, neutralized with an alkanolamine to form a water soluble salt. Suitable alkanolamine neutralizers include amino methyl propanol triethanolamine, and diethanolamine, with amino methyl propanol preferred. The amount of the coupling agent typically ranges from about 0.04% to 0.1 % by weight, more preferably 0.04 to 0.05%.

The invert fuel emulsion composition can include additives which perform multiple functions. For example, [Diacid]DIACID 1550 acts as a surfactant, lubricant, and coupling agent and citric acid has both emulsion enhancement and corrosion inhibitory properties. Similarly, AMP-95 acts as a neutralizer and helps maintain the pH of the fuel composition and ammonium nitrate, if used, acts as a cetane improver and an emulsion stabilizer.[.]

Page 20, tables 1 and 2:

	Concentration in ppm in Oil Phase				
Formulation	Amide Surfactant	Block Co-Polymer	Additional Surfactant Stabilizers		Rating
XVII	6000 Of SOA	3000 of 17R2	800 of E464	300 of [Emulsan]EMULSAN	2

XVIII	6000 of SOA	3000 of 17R2	800 of E464	500 of BX12	2
XIX	6000 Of SOA	2000 of 17R2	600 of A-60	600 of S104	2
XX	4500 of SOA	3000 of 17R2	800 of E464		10

Rating on a scale of 1 to 10, 1 being more stabile.

Surfactants used in the above formulations:

Notation	Manufacturer	Brand	Description
17R2	BASF	[Pluronic]PLURONIC 17R2	Block co-polymer
17R4	BASF	[Pluronic]PLURONIC 17R4	Block co-polymer
25R2	BASF	[Pluronic]PLURONIC 25R2	Block co-polymer
L43	BASF	[Pluronic]PLURONIC L43	Block co-polymer
L31	BASF	[Pluronic]PLURONIC L31	Block co-polymer
L61	BASF	[Pluronic]PLURONIC L61	Block co-polymer
SOA	Scher Chemical	[Schercomid]SCHERCOMID SO-A fatty oliamide DBA	1:1 fatty acid Diethanolamide of
E464	ICI	[Hypermer]HYPERMER E464	Polymeric
A-60	ICI	[Hypermer]HYPERMER A-60	Polymeric
S-104	Air Products	[Surfinal]SURFINAL 104	Decyne diol unique
BX12	Lonza	[Barlox]BARLOX	Amine oxide
Emulsan	Emulsan		Bio-polymer
T12	Okzo	[Ethamine]ETHAMINE T12	Amine othoxilate
DM 430		IGEPAL	Dinonylphenol Ethoxylate
DS/280.			

Page 24, Paragraph 62:

A preferred fuel composition has the following composition: diesel, purified water, methanol, 2-ethylhexylnitraite, SO-A, 17R2 and E-464.[.]